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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/838,677	04/19/2001	Karl J. Haltiner JR.	DP-302922 (DEP-0183)	8153

7590 09/10/2003

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EXAMINER

WILLS, MONIQUE M

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application N .

09/838,677

Applicant(s)

HALTNER, KARL J.

Examiner

Wills M Monique

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1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1,6-10 rejected under 35 U.S.C. 102(e) as being anticipated by Yang et al. U.S. Patent 6,322,919.

Yang teaches a fuel cell stack comprising first plate 64 and second plate 14 (Fig. 4). The flow channels 68 and 12 of the first and second plate are oriented in directions perpendicular to each other (fig. 4). The plates juxtapose each other such that they are inherently in thermal communication with each other. The bipolar plate 12 configured such that adjacent oxidant channels 18 and fuel channels 24 are offset from one another in a direction traverse to the fuel and oxidant paths defined thereby (col. 3, lines 30-35). Each of said plates comprising fuel inlet and outlet manifolds 32 and 34, oxidant inlet and outlet manifolds 36 and 38, and coolant inlet and outlet manifolds 40 and 42 formed in the frame (col. 3, lines 65-68 and col. 4, lines 1-5). The fuel inlet manifold 32 is connected to the inlet ends of the fuel channels 24 by a series of inlet

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tubes 46 that extent through portion of the frame member 30 and the oxidant inlet manifold 36, while the outlet ends of the fuel channels are connected to the fuel outlet manifold 34 by a series of outlet tubes 48 that extend through portions of the frame member and the oxidant outlet manifold 38. Similarly, the oxidant inlet manifold is connected to the inlet ends of the oxidant channels 18 by a series of inlet tubes 50 that extend through a portion of the frame member 30, while the outlet ends of the oxidant channels are connected to the oxidant outlet manifold 38 by a series of outlet tubes 52 that extend through another portion of the frame member. See column 4, lines 5-20.

The inlet manifolds of the first plat 64 are aligned with the inlet manifolds of the second plate 14 (Fig. 4). The outlet manifolds of the first plate 64 are aligned with the outlet manifolds of the second plate 14 (Fig. 4). Each of said first and second plate comprises anode and cathode supply openings (Fig. 6). Further, a plurality of ribs separate the anode supply channel from the cathode supply channels (fig. 2 and col. 4, lines 5-20).

Therefore, the instant claims are anticipated by Yang.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. U.S. Patent 6,322,919 as applied to claim 1 above, in view of Pratt et al. U.S. Patent 6,132,895 and further in view of Spear, Jr. et al. U.S. Patent 6,051,331.

Yang teaches a fuel cell component as described hereinabove.

The reference is silent to etching the flow channels into the plate. The reference is also silent to etching forms including S-shape patterns or serpentine patterns.

Pratt teaches that it is conventional to employ etching as a means of forming flow channels in bipolar plates. More specifically, the reference teaches that the preferred method of making the channels is by chemically etching them, using photolithography. This generally results in channels that are 0.1 to 1 mm deep, with about 0.4 mm being preferred. Of course, other means of forming the channels, such as by machining, can also be used, but the most accurate and cost effective means is to chemically etch them. Chemical etching also results in channels that have a surface that is microscopically rough, and this aids in gas flow distribution

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and heat exchange, which is also an advantage of our invention. See column 5, lines 20-30.

Spear teaches that it is conventional to etch serpentine microchannels in bipolar plates in order to provide more uniform distribution of reactant gasses (abstract and col. 8, lines 4-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to etch flow channels into the bipolar plate of Yang in order to create surfaces on the channels that are microscopically rough to aid in gas flow distribution.

Additionally, it would have been obvious to one of ordinary skill in the art to etch serpentine microchannels into the plate of Yang, in order to provide more uniform distribution of reactant gases.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. U.S. Patent 6,322,919, in view of Pratt et al. U.S. Patent 6,132,895 and further in view of Roberts et al. U.S. Pub. 2001/0055707.

Yang teaches a bipolar plate assembly in a fuel cell stack as taught hereinabove. The reference also teaches that a reformat is supplied to the cathode supply (col. 6, lines 1-15).

The reference is silent to etching the flow channels and heating the oxidant and reformat.

Pratt teaches that it is conventional to employ etching as a means of forming flow channels in bipolar plates. More specifically, the reference teaches that the preferred method of making the channels is by chemically etching them, using photolithography. This generally results in channels that are 0.1 to 1 mm deep, with about 0.4 mm being preferred. Of course, other means of forming the channels, such as by machining, can also be used, but the most accurate and cost effective means is to chemically etch them. Chemical etching also results in channels that have a surface that is microscopically rough, and this aids in gas flow distribution and heat exchange, which is also an advantage of our invention. See column 5, lines 20-30.

Roberts teaches heating the reformat and the oxidant before charging into the fuel cell in order to prevent drying of the ion transfer membrane (par. 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to etch flow channels into the bipolar plate of Yang in order

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to create surfaces on the channels that are microscopically rough to aid in gas flow distribution.

Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to heat the reformat and oxidant in order to prevent drying of the ion transfer membrane.

### ***Conclusions***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pien et al. U.S. Pub. 2002/0110719 teaches a multipart separator plate for an electrochemical cell. Enami U.S. Patent 5, 922,485 teaches a solid polymer electrolyte fuel cell. McElroy U.S. Patent 6,329,090 teaches an enthalpy recovery fuel cell system. Dong et al. U.S. Pub. 2002/0119360 teaches an oxidant flow field for solid polymer electrolyte fuel cells.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (703) 305-0073. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.



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If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Randy Gulakowski, may be reached at 703-308-4333.

The unofficial fax number is (703) 305-3599. The Official fax number for non-final amendments is 703-872-9310. The Official fax number for after final amendments is 703-872-9311.

Mw

8/31/03

A handwritten signature in black ink, appearing to read "Randy Gulakowski". The signature is fluid and cursive, with the first name "Randy" and last name "Gulakowski" clearly distinguishable.

RANDY GULAKOWSKI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700